

OXMO-24,721

PATENT

THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: WILLIAM C. SCOFIELD and STEVAN O. SAUNDERS

Serial No.:

For: VIRTUALLY POSITIONED HEAD MOUNTED SURROUND SOUND
SYSTEM

"EXPRESS MAIL" CERTIFICATE

Number: EL021320022US

Date of Deposit: 9/8/99

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

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Matthew Dworaczek
Signature of Person Mailing Application
Matthew Dworaczek
Typed or Printed Name

Dear Sir:

PRELIMINARY AMENDMENT

Prior to the initial review, please amend as follows the accompanying Rule 1.53(b) continuation application of pending prior application Serial No. 09/200,396 filed on November 24, 1998.

IN THE TITLE OF THE INVENTION

Please delete the present title of the invention and insert therefor: "METHOD AND APPARATUS FOR VIRTUAL POSITIONING OF SOUND SOURCES IN THREE DIMENSIONS."

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IN THE TECHNICAL FIELD OF THE INVENTION

Please delete the entire TECHNICAL FIELD OF THE INVENTION and insert therefore:

82 -- The present invention pertains in general to a sound reproduction system and more particularly, to a sound reproduction system for virtual positioning of sound sources in three-dimensional space. --

IN THE CROSS REFERENCE TO RELATED APPLICATIONS

Please delete the entire CROSS REFERENCE TO RELATED APPLICATIONS in the present application and insert therefor the following:

83 668000-00226260 -- The present Application is a continuation Application of U.S. patent Application S/N 09/200,396 entitled "Virtually Positioned Head Mounted Surround Sound System", filed November 24, 1998, Attorney Docket No. OXMO-24,534; which is a continuation of U.S. Pat. No. 5,841,879 entitled "Virtually Positioned Head Mounted Surround Sound System", issued November 24, 1998, Attorney Docket No. OXMO-24,057; which is a continuation of U.S. Pat. No. 5,661,812 entitled "Head Mounted Surround Sound System", issued August 26, 1997, Attorney Docket No. OXMO-22,708; which is a continuation of U.S. patent Application S/N 08/208,622 entitled "Head Mounted Surround Sound System", filed March 8, 1994, abandoned, Attorney Docket No. OXMO-22,708.--

IN THE SUMMARY OF THE INVENTION

Please delete the entire SUMMARY OF THE INVENTION in the present application, and insert therefor the following:

84 -- The present invention disclosed and claimed herein comprises a method and apparatus for virtually positioning, in real time, a sound source in three-dimensional space as perceived during

playback having the steps of binauralizing an input sound signal to provide a left output signal and a right output signal, and playing the left and right output signals through respective left and right loudspeakers of a localized speaker headset. The step of binauralizing further includes the steps of processing the input sound signal to provide a plurality of sound signals corresponding to virtual locations disposed in an azimuthal plane with respect to the position of the listener; repositioning select ones of the virtual locations to apparent positions above and below the azimuthal plane; and mixing the plurality of sound signals including any repositioned select ones of the virtual locations, to provide the left output signal and the right output signal. The step of playing further includes the steps of supporting the left and right loudspeakers proximately in the plane of the zygomatic arch of the listener in rearward facing relationship with respect to the listener's head for radiating sound toward the pinna of the listener's respective left and right ears; and coupling the left and right output signals to corresponding left and right signal inputs of the localized speaker headset.

In another aspect of the present invention, a video image is associated with the input sound signal. An external loudspeaker may be proximately associated with the video image for reproducing voiced sounds corresponding with the video image or sounds comprising a select portion of the audible frequency spectrum of the input sound signal.

In another aspect of the present invention, the perceived virtual locations of the sound sources do not vary with movement of the listener or of the listener's head in the azimuthal plane at the listening location.

In another aspect of the present invention, there is disclosed and claimed herein a method and apparatus for virtually positioning, in real time, a sound source in three-dimensional space as perceived during playback having the steps of inputting a stereo audio signal from a video program prerecorded to include surround sound audio; decoding the surround sound audio to provide a plurality of surround sound signals; binauralizing the plurality of surround sound signals to provide a left output signal and a right output signal; and playing the left and right output signals through respective left and right localized loudspeakers. --